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Motozi TAGAWA*: *Pyrrosia* of Japan, Korea, and the Ryūkyū Islands

田川基二*: 日本・朝鮮・琉球のヒトツバ属

The present paper is a concise review of five species of *Pyrrosia* growing wild in Japan, Korea, and the Ryūkyū Islands, and a sequel to the writer's "*Pyrrosia* of Formosa**" as well. The specimens cited in the text, except those otherwise stated, are all preserved in the Herbarium of the University of Kyōto.

Key to the species

1. Sori arranged in a single row on each side of the costa; leaves linear, under 5 mm wide(1) *P. linearifolia*
1. Sori multiseriate on each side of the costa; leaves much broader.
 2. Leaves usually strongly dimorphous, the fertile linear-elongate, much longer than the sterile(2) *P. adnascens*
 2. Leaves monomorphous or nearly so.
 3. Lamina hastately trilobed, the base usually cordate, rarely broad-cuneate. (3) *P. tricuspis*
 3. Lamina simple.
 4. Rhizome under 2 mm thick; lamina 2-8 cm long, regularly and densely dotted above, the petiole usually much longer than the lamina; sori confluent; lateral main veins not distinct(4) *P. petiolosa*
 4. Rhizome ca. 3 mm thick; lamina 10-30 cm long, sparsely dotted above, the petiole as long as or shorter than the lamina; sori and lateral main veins distinct(5) *P. lingua*

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(1) **Pyrrosia linearifolia** (Hk.) Ching, Bull. Chinese Bot. Soc. **1**: 48. 1935; Tag., Journ. Jap. Bot. **24**: 116. 1949, as var. *typica*.—*Niphobolus linearifolius* Hk., 2nd Cent. Ferns t. 58. 1861, type from Tsus Sima, gulf of Korea.—*Polypodium linearifolium* (Hk.) Hk., Sp. Fil. **5**: 53. 1863.—*Cyclophorus linearifolius* (Hk.) C. Chr., Ind. Fil. 199. 1905, excl. pl. from Formosa and China.—*Neoniphopsis linearifolius* (Hk.) Nakai, Bot. Mag. Tokyo **42**: 217. 1928.

Illustration: Ogata, Ic. Fil. Jap. **1**: pl. 15. 1928, as *Cyclophorus linearifolius*.

Japan throughout and in Korea generally, extending northward to south Manchuria, rather rare, growing on mossy rocks or tree trunks in moderately shaded places in mountain forests at low elevation. I think it unnecessary to cite many specimens of this species which have been obtained in various parts of Japan and Korea.

This species is not yet reported from the main land of China and the Ryûkyû Islands, but it is noteworthy that it occurs in Formosa as var. *heterolepis* Tag., l. c.

(2) **Pyrrosia adnascens** (Sw.) Ching, Bull. Chinese Bot. Soc. **1**: 45. 1935; Tag., Acta Phytotax. Geobot. **9**: 232. 1940; Journ. Jap. Bot. **24**: 116. 1949.—*Polypodium adnascens* Sw. Syn. Fil. 25, 222. t. 2, f. 2. 1806, type from Malabar, India.

Illustration: Ogata, Ic. Fil. Jap. **1**: pl. 12. 1928, as *Cyclophorus adnascens*.

Ryûkyû, rare, on tree trunks or occasionally on rocks in level land.

Isl. Okinawa: Yonesu, Mabuni-mura, Simaziri-gun, Taira (Kanasiro Herb. No. 2096).

Wide-spread in the tropical and subtropical Asia and in Polynesia.

(3) **Pyrrosia tricuspis** (Sw.) Tagawa, comb. nov.—*Acrostichum hastatum* Houtt., Nat. Hist. **14**: 68. pl. 95, f. 2. 1783, type from Japan.—*Acrostichum hastatum* Thbg., Fl. Jap. 331. t. 34. 1784, not Houtt. 1783, type from Japan.—*Niphobolus hastatus* (Thbg.) Kunze, Bot. Zeit. **6**: 505. 1848.—*Cyclophorus hastatus* (Thbg.) C. Chr., Ind. Fil. 199. 1905.—*Pyrrosia hastata* (Thbg.) Ching, Bull. Chinese Bot. Soc. **1**: 48. 1935.—*Polypodium tricuspe* Sw. in Schrad. Journ. **1800**²: 21. 1801, based on *A. hastatum* Thbg.; Syn. Fil. 30. 1806.—*Niphobolus tricuspis* (Sw.) J. Sm., Hist. Fil. 98. 1875.

The above synonymy shows the change of the name to be necessary for this species.

Illustration: Ogata, Ic. Fil. Jap. **1**: pl. 14. 1928, as *Cyclophorus hastatus*.

Rhizome creeping, to 10 cm long, stout, densely scaly; scales rigid, blackish-brown, lanceolate or ovate-lanceolate, acute, to 3 mm long, the margin membranous,

rufous-brown, fimbriate. Petiole aggregate, stout, 10-20 cm long, sometimes to 30 cm long, tomentose, at length often glabrescent; lamina hastato-trilobed, 5-15 cm long by 4-10 cm wide, usually cordate at the base, the central lobe lanceolate or elongate-triangular, acute or acuminate, entire or rarely repand, the lateral ones spreading, usually with a small deflexed lobe at the base; texture very thick, carnose-coriaceous; lower surface densely stellate-tomentose, the hairs uniform, whitish-brown or sometimes rufous-brown, with linear-lanceolate arms, the upper surface at length glabrous; veins quite hidden, the lateral main veins erect-patent. Sori small, sunken in the tomentum, more or less regularly arranged in rows of 3-6 between the main veins, of 9-12 between the costa and the margin.

Japan throughout and in southern Korea, rare, growing on mossy rocks or tree trunks in moderately shaded places in mountain forests at low elevation.

Japan. Hokkaidô: Mt. Okishiomappu, Hidaka, Tatewaki; Apoinupuri, Hidaka, Tusima (Herb. Univ. Tôkyô); Niikappu, Hidaka, Miyabe (Herb. Univ. Tôkyô); Iburi, Miki; Moiwayama, Sapporo, Itô; in arboribus sylvarum Jirafu, Faurie 7221; Hakodate, Faurie 1563; without exact locality, Koidzumi. Honsyû. Pref. Aomori: Towada, Kinasi. Pref. Nagano: Kawabe-mura, Kitasaku-gun, Misetu (Herb. Univ. Tôkyô). Pref. Sizuoka: Yugashima in Idzu, Faurie 36; Mt. Amagi, Kitamura. Pref. Aiti: Niwano, Yana-mura, Yana-gun, Torii 3104. Pref. Siga: Hirako-dani in Mt. Hiei, Hasimoto. Pref. Oosaka: Mino, Sonobe 377. Pref. Wakayama: Ryûzin-mura, Hidaka-gun Uemori (Herb. Univ. Tôkyô); *ibid.*, Kitasima (Herb. Univ. Tôkyô); Murokawa-dani in Shimizu-chô, Arita-gun, Tagawa & Iwatsuki 150. Pref. Hyôgo: Iwagami National Forest, Sisô-gun, Tatebe; Mt. Seppiko, north of Himezi, Tagawa 3937. Pref. Okayama: above Kanatiana, Idono, Hokubô-tyô, Zyôbô-gun, Tagawa 5853. Pref. Tottori: Wakasa-tyô, Yazu-gun, Tanaka. Sikoku. Pref. Tokushima: Koyataira-mura, Oegun, Nikai (Herb. Univ. Tôkyô). Pref. Kôti: Suginokawa, Kamihayama-mura, Yosinaga (Herb. Univ. Tôkyô); *ibid.*, Makino (Herb. Univ. Tôkyô); Narukawa-dani in Mt. Kakuden-yama, Takaoka-gun, Tagawa 2922. Pref. Ehime: Mt. Odamiyama, Yamasita (Herb. Univ. Tôkyô). Kyûsyû. Pref. Hukuoka: Kuroki-mura. Yame-gun, Tasiro. Pref. Ooita: Handa-mura to Yunohira Pass, Kusu-gun, Tasiro; Tutami-mura, Simoke-gun, Yamasaki. Pref. Kumamoto: Mt. Naidaizin, Doi 160; Mt. Yadake, Tasiro; Gokanosyô, Tasiro. Pref. Kagosima: Mt. Zyussôzan, Sin 10.

Korea. Prov. Zenra-Nandô (全羅南道): in rupibus Quelpaert, Faurie 80; Isl. Hokiti-tô (甫吉島), Tyô (張亨斗) 1603; Isl. Yomogi-zima (艾島), Tyô 430; *ibid.*, Nakai (Herb. Univ. Tôkyô); Isl. Kyobun-tô (巨文島), Nakai (Herb. Univ. Tôkyô);

Dôhukusekiheki (同福赤壁), Tyô 431. Prov. Keisyô-Nandô (慶尚南道): Huzan (釜山), Uchiyama (Herb. Univ. Tôkyô).

Not found elsewhere.

P. tricuspis and *P. polydactylis* (Hance) Ching, both of which are of restricted distribution, are very unique in the genus, because of their constantly hastately or palmately dissected leaves. Leaves of *P. tricuspis* are hastately 3-lobed, the scales at the base of petiole are ovate-lanceolate and the hairs on the lower surface of leaves have narrowly lanceolate arms. While in *P. polydactylis* leaves are palmately 5-9-parted, the scales at the base of petiole are much longer, linear-subulate, and the hairs have needle-like arms.

(4) ***Pyrrosia petiolosa*** (Christ) Ching, Bull. Chinese Bot. Soc. 1: 59. 1935. —*Polypodium petiolosum* Christ, Nu. Giorn. Bot. Ital. n. s. 4: 96. t. 2. 1897, type from Shensi, China. —*Niphobolus petiolosus* (Christ) Diels in Engl. Bot. Jahrb 29: 207. 1900. —*Cyclophorus petiolosus* (Christ) C. Chr., Ind. Fil. 200. 1905.

Rhizome slender, long-creeping, stout, under 2 mm thick, densely scaly; scales adpressed, imbricate, lanceolate, finely acuminate, ca. 4 mm long, rufous-brown, at length turning blackish, the margin much paler, fimbriate-ciliate. Stipe distant, slender, usually much longer than the lamina, 2-10 cm or sometimes to 15 cm long, stellate-tomentose; lamina elliptic to oblong-lanceolate, or the smaller ones ovate-elliptic or rarely spatulate, 2-8 cm long by 1-2.5 cm wide, strongly inrolled when dry, obtuse or acute or sometimes rounded at the apex, acute or acuminate at the base, entire on the margin; texture coriaceous; upper surface glabrous or very sparsely stellate-pillose, regularly and deeply pitted, the under surface densely stellate-tomentose, the hairs uniform, with narrowly lanceolate arms, rufous-brown, at length turning whitish; lateral main veins very oblique, obscure. Sori confluent.

Korea throughout, growing on exposed cliffs or hillside.

Prov. Kankyô-Hokudô (咸鏡北道): Seisui (西水羅), Ohwi 627; Mosanrei (茂山嶺), Ohwi 984; Nansan-men (南山面), Kyôzyô-gun (鏡城郡), Saito 2530; Kyôzyô (鏡城), Saitô 2845, Syuotun (朱乙溫), Koidzumi. Prov. Heian-Nandô: Heizyô (平壤), Koidzumi; Pyen-yang in *rupibus communis*, Faurie 707; in *muris Hpyenyang*, Faurie 79; Ryûhō-ri (竜峯里), Daidô-gun (大同郡), Suzuki. Prov. Keiki-Dô (京畿道): Keizyô (京城), Boku (朴万圭) 816; Tyôsen-ri Risen-gun (利川郡) Nakai (Herb. Univ. Tôkyô). Prov. Zenra-Nandô (全羅南道): Dôhukusekiheki (同福赤壁), Tyô (張亨斗) 428; Zyuntun (順天), Tyô 429. Prov. Keisyô-Nandô (慶尚南道): Mt. Bôsin-zan (望晉山), Sinsyû (晉州), Yokoyama 297.

(5) ***Pyrrosia lingua*** (Thbg.) Farwell, Amer. Midl. Naturalist **12**: 302. 1931; Ching, Bull. Chinese Bot. Soc. **1**: 60. 1935; Tag., Journ. Jap. Bot. **24**: 117. 1949. —*Acrostichum lingua* Thbg., Fl. Jap. 330. t. 33. 1784, type from Nagasaki, Japan. —*Polypodium lingua* (Thbg.) Sw. Syn. Fil. 29. 1806. —*Niphobolus lingua* (Thbg.) Spr. Syst. Veg. **4**: 45. 1827. —*Cyclophorus lingua* (Thbg.) Desv. Prod. 224. 1827. —*Pyrrosia lingua* var. *macrophylla* Nakai, Bull. Sci. Mus. No. 27. 23. 1949, type from Kyûsyû, Japan, nothing but an extreme form with large ample leaves, perhaps growing in shaded moist places.

Illustrations: Mak., Phan. Pter. Jap. Ic. Ill. **1**: pl. 43. 1901, as *Niphobolus lingua*; Ogata, Ic. Fil. Jap. **1**: pl. 16. 1928, as *Cyclophorus lingua*.

Warm districts of Japan, southernmost Korea, and in the Ryûkyû Islands generally, growing on rocks or rocky cliffs and sometimes on the ground in lowland and in mountainous regions at low elevation, in the southern countries often found on old tree trunks, usually most vigorously growing in exposed places and on edges of forests. It is also unnecessary to cite many specimens of this species which have been obtained in all warm parts of Japan and in the Ryûkyû Islands. The following Korean specimens have been examined:

Prov. Zenra-Nandô (全羅南道): Isl. Daikokusan-tô (大黒山島), Isidoya (Herb. Univ. Tôkyô); Sekimonsan (石門山), Dôgan-men (道岩面), Kôsin-gun (康津郡), Tyô (張亭斗) 432; in rupibus Quelpaert, Faurie 78; in rupibus silvarum Quelpaert, Faurie 2175; Quelpart, Isidoya (Herb. Univ. Tôkyô); ibid., Nakai 6616 (Herb. Univ. Tôkyô); ibid., Boku (朴万圭) 422.

China, the Yangtze Valley and southwards, extending to Formosa and Indo-China.

f. ***monstrifera*** Tagawa, Journ. Jap. Bot. **26**: 21. 1951.

Japan, rare, growing alongside f. *lingua*

Japan. Honsyû. Pref. Hyôgo: Isl. Kemuri-zima near Hukura, Awazi, Yamadori, holotype. Pref. Wakayama: Ikenoyama, Takaike Chô, Higashimurô-gun. Iwatsuki 1381. Sikoku. Pref. Ehime; Uwazima, Imaizumi.

f. ***cristata*** (Mak.) H. Itô in Honda, Nom. Pl. Jap. 22, 514. 1939. —*Cyclophorus lingua* f. *cristatus* Mak. in Mak. et Nem., Fl. Jap. 1596. 1925, in Japanese.

Apex of lamina irregularly several times dichotomously divided into twisted segments.

Japan, usually in culture, rarely found in wild condition.

This form is, I think, a monstrosity resulted from pathological causes.